

Appl. No. *To Be Assigned*; Filed: *Herewith*  
Dkt. No. 1716.051000A; Group Art Unit: *To Be Assigned*  
Inventors: Miettinen-Oinonen *et al.*; Tel.: (202) 371-2600  
Title: Novel Cellulases, the Genes Encoding Them and Uses  
Thereof

ALKO4179: pH-DEPENDENCY OF  
THE ENDOGLUCANASE ACTIVITY

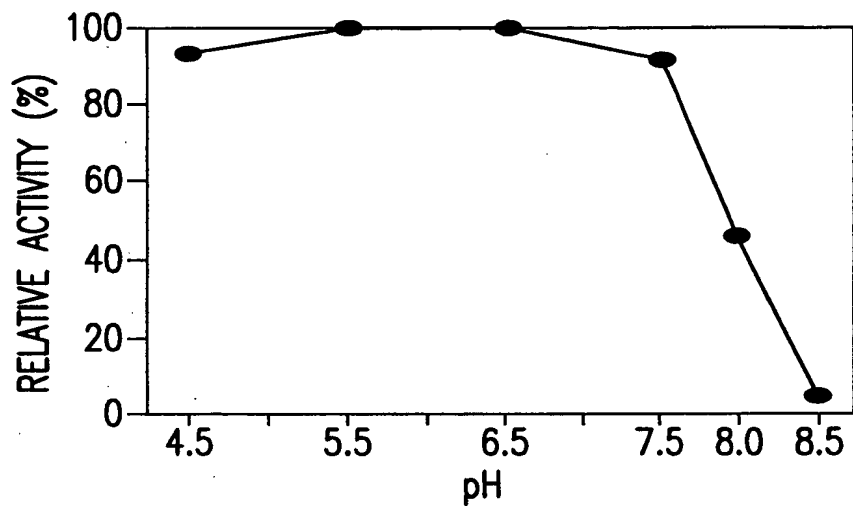


FIG.1A

ALKO4179: TEMPERATURE DEPENDENCY OF  
THE ENDOGLUCANASE ACTIVITY

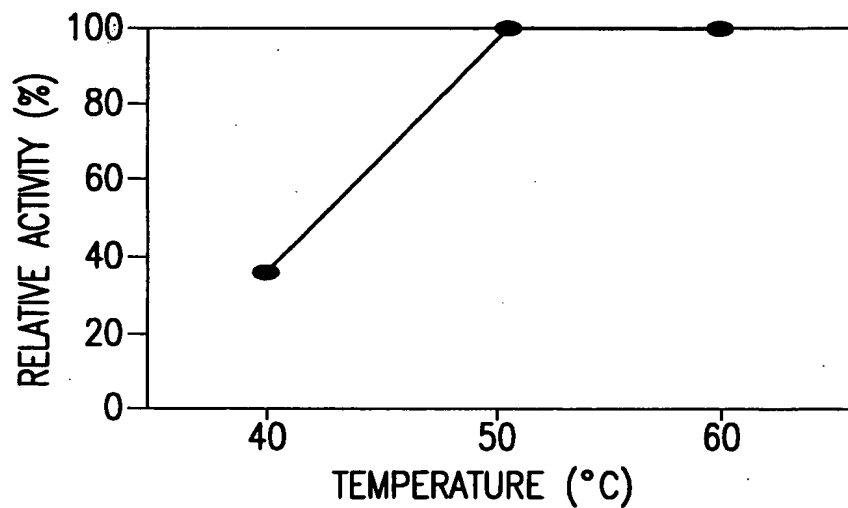


FIG.1B

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ALKO4124: pH-DEPENDENCY OF  
THE ENDOGLUCANASE ACTIVITY

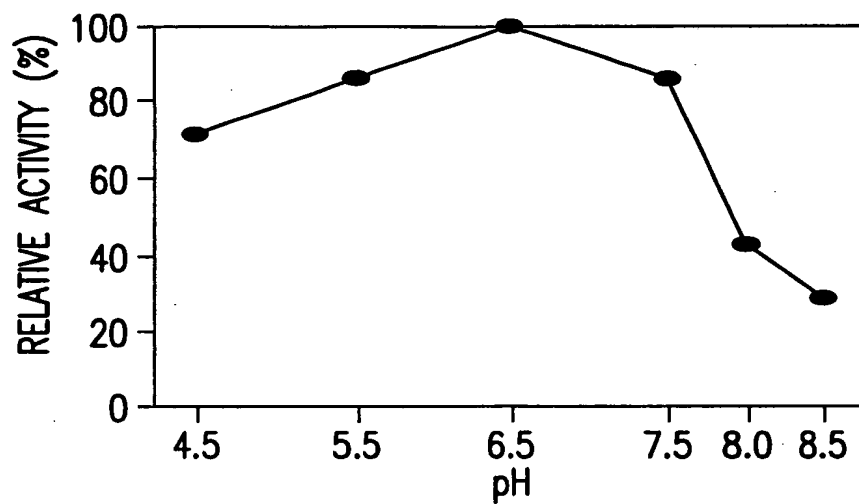


FIG.2A

ALKO4124: TEMPERATURE DEPENDENCY OF  
THE ENDOGLUCANASE ACTIVITY

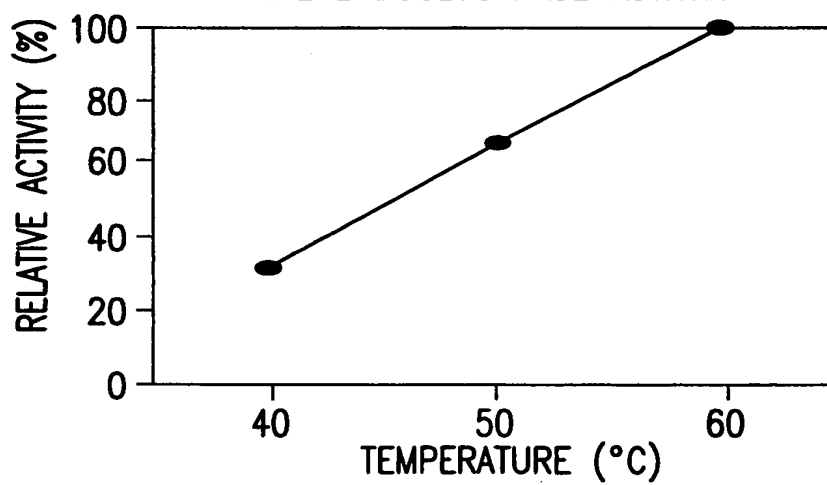


FIG.2B

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ALKO4237: pH-DEPENDENCY OF  
THE ENDOGLUCANASE ACTIVITY

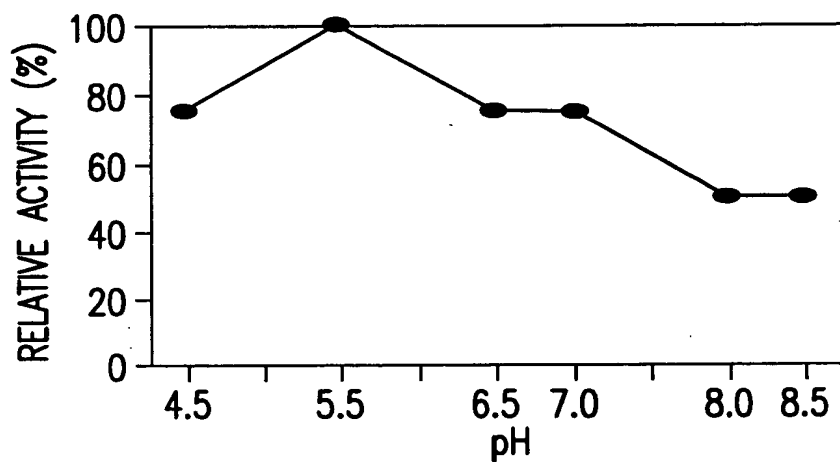


FIG.3A

ALKO4237: TEMPERATURE DEPENDENCY OF  
THE ENDOGLUCANASE ACTIVITY

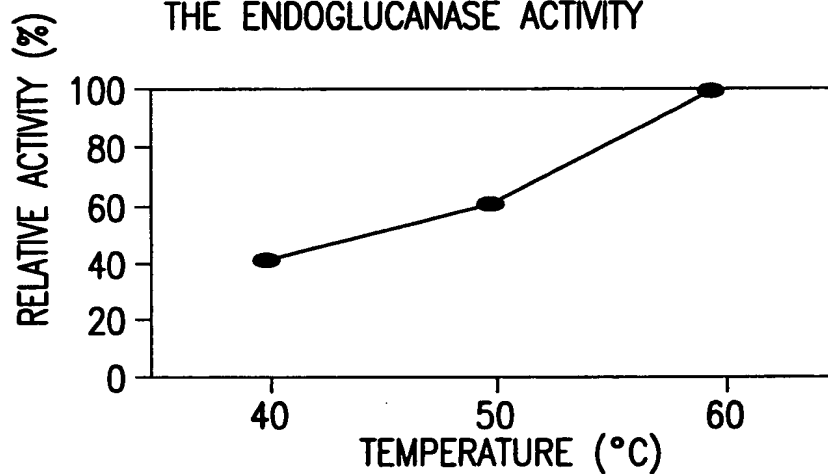


FIG.3B

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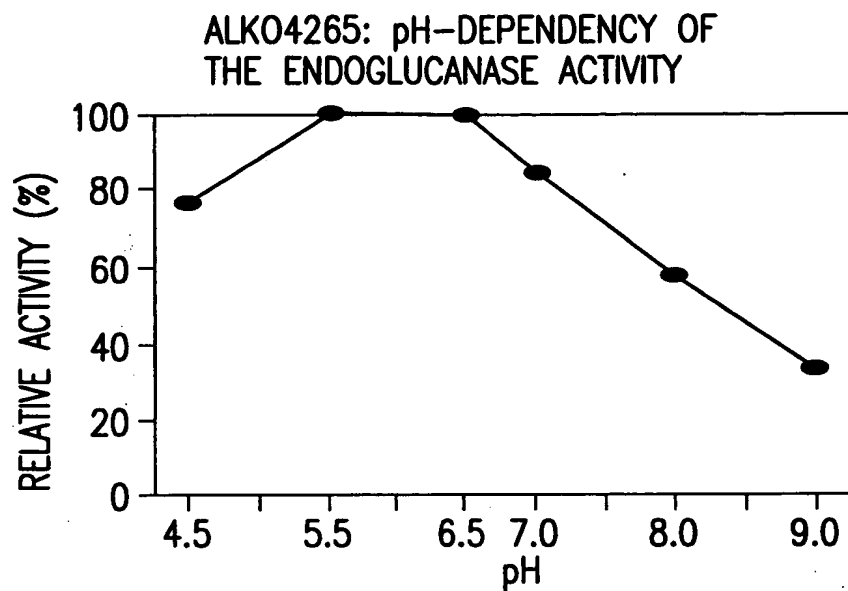


FIG.4A

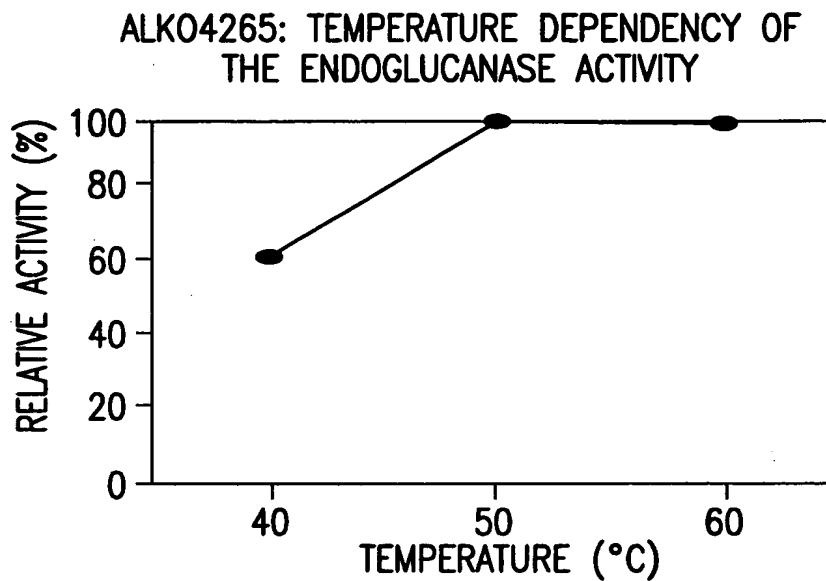


FIG.4B

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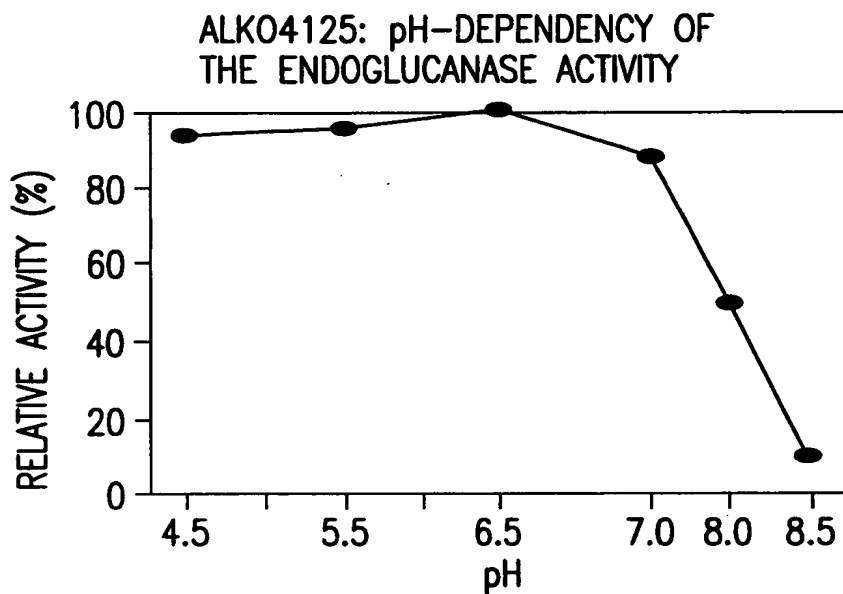


FIG.5A

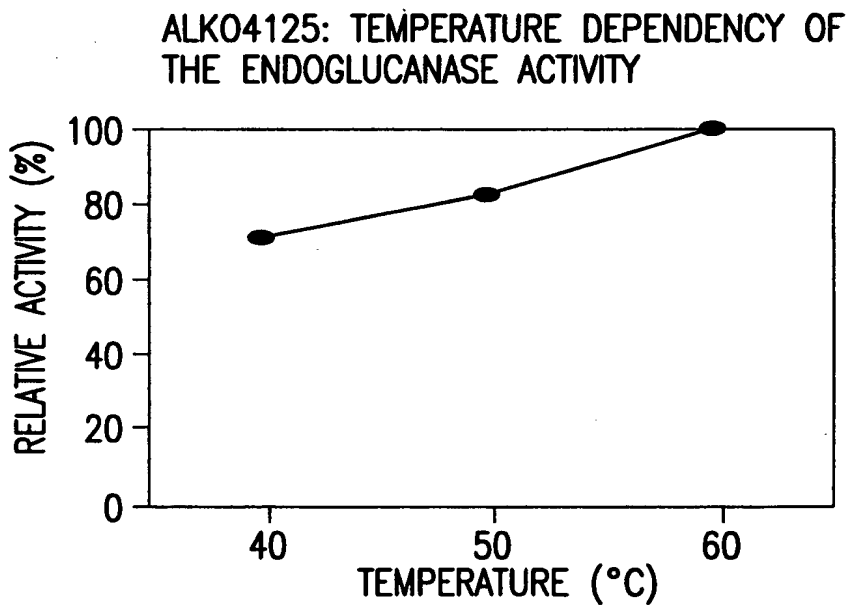
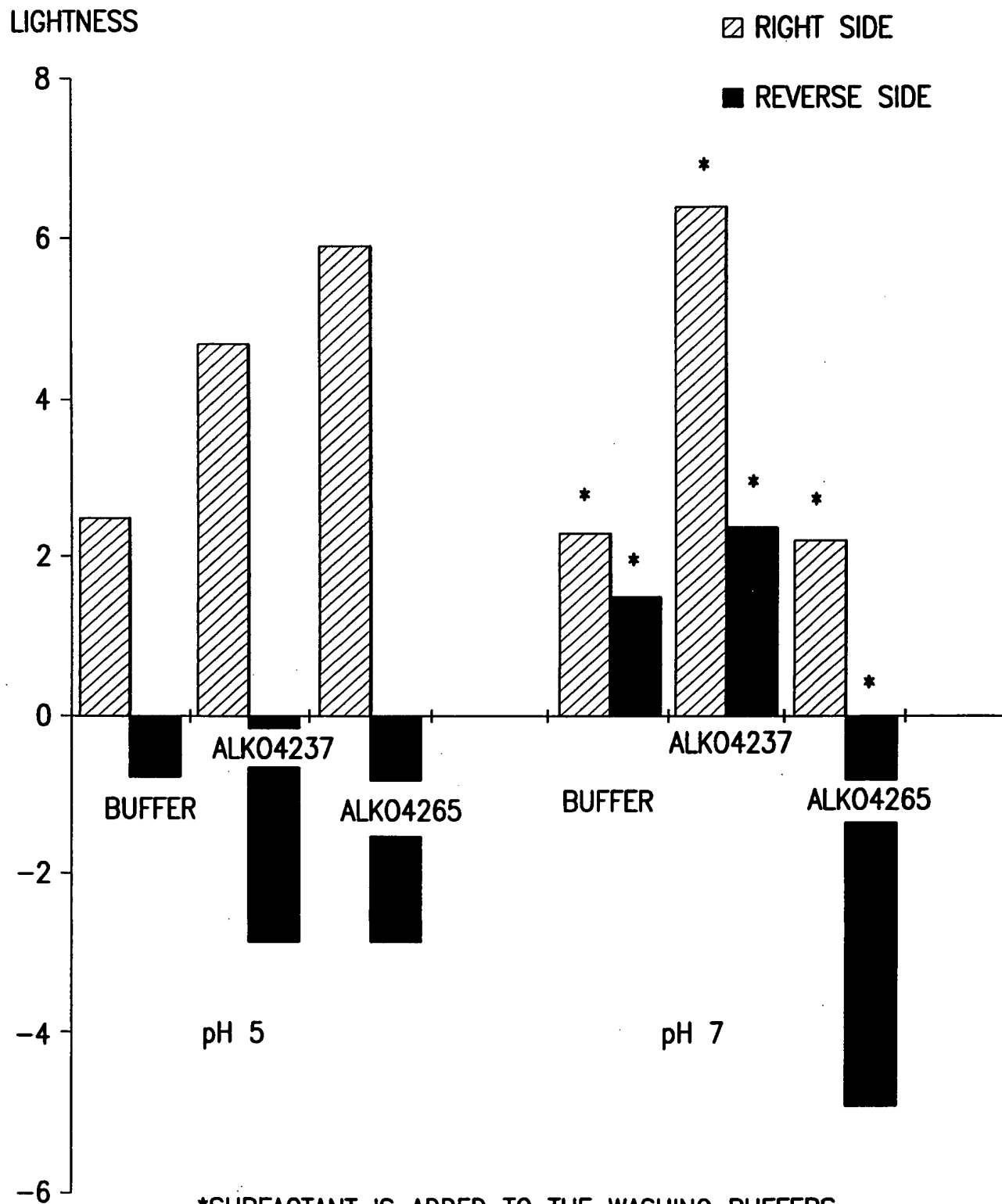


FIG.5B

### WASH EFFECT AND BACKSTAINING WITH NEUTRAL CELLULASES



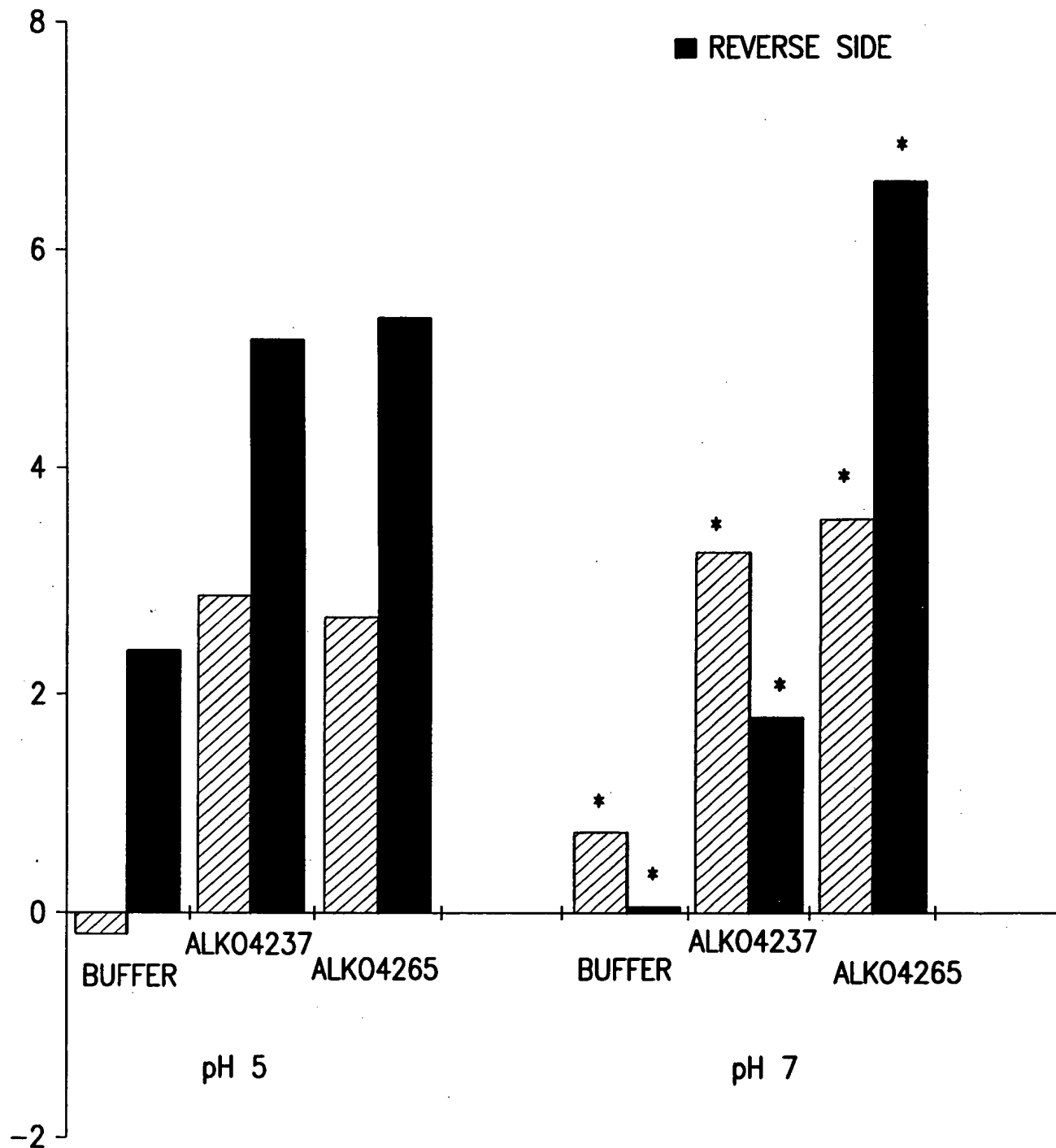
## FIG.6A

## BLUENESS WITH THE NEUTRAL CELLULASES

BLUENESS

▨ RIGHT SIDE

■ REVERSE SIDE



\*SURFACTANT ADDED TO THE WASHING BUFFERS

FIG.6B

# WASH EFFECT AND BACKSTAINING WITH ECOSTONE L

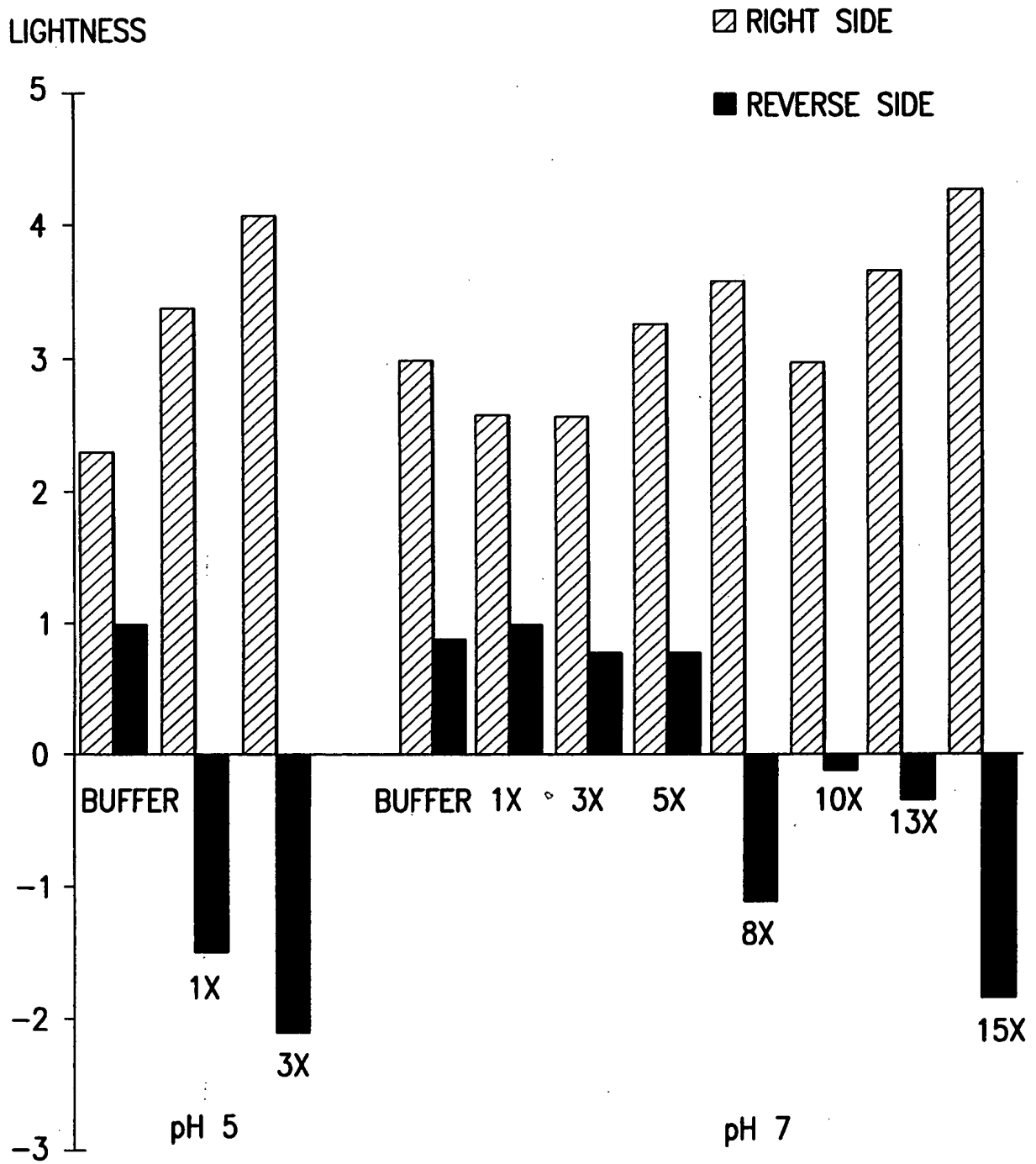


FIG.7A



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# BLUENESS WITH ECOSTONE L

BLUENESS

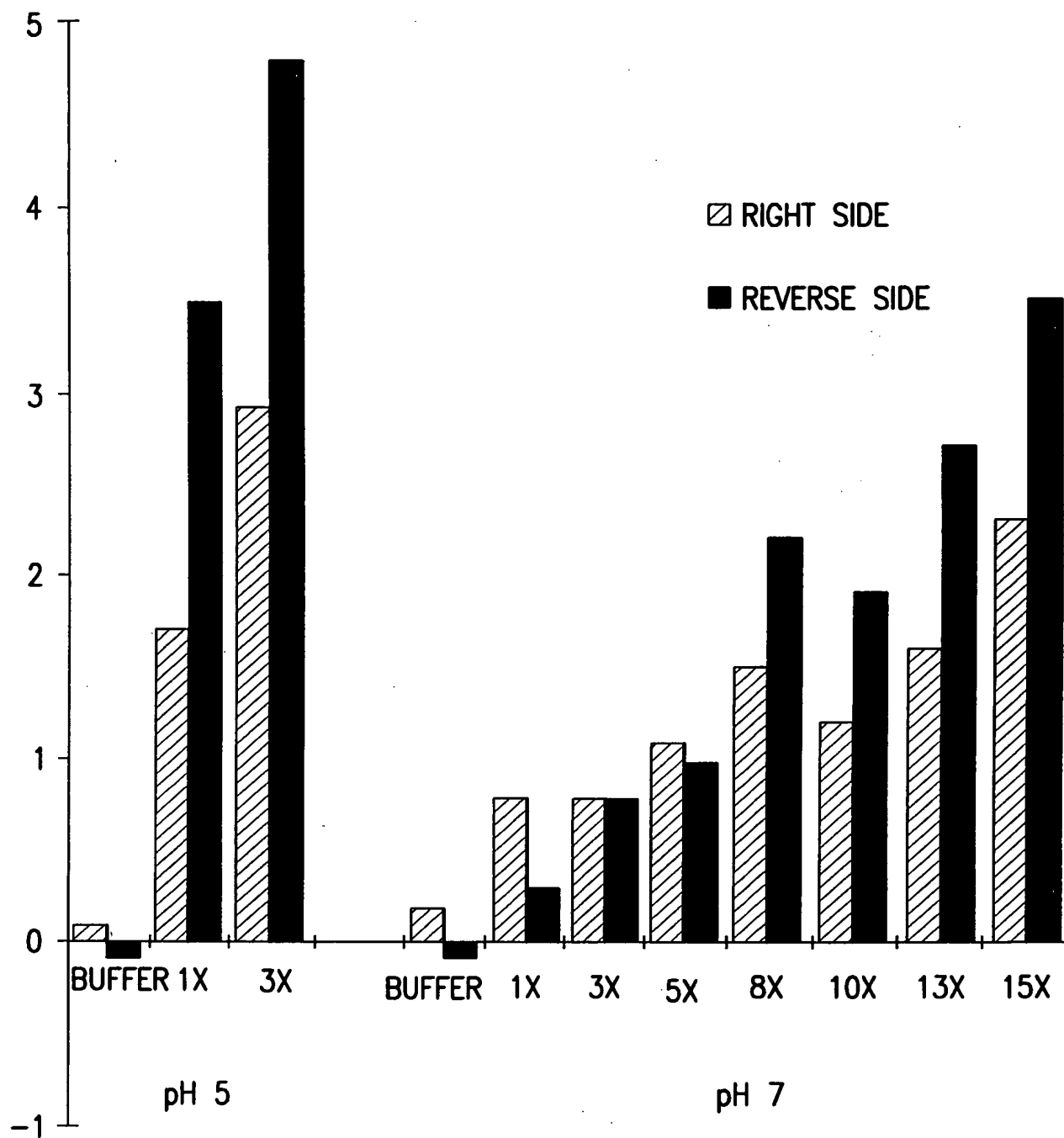


FIG.7B

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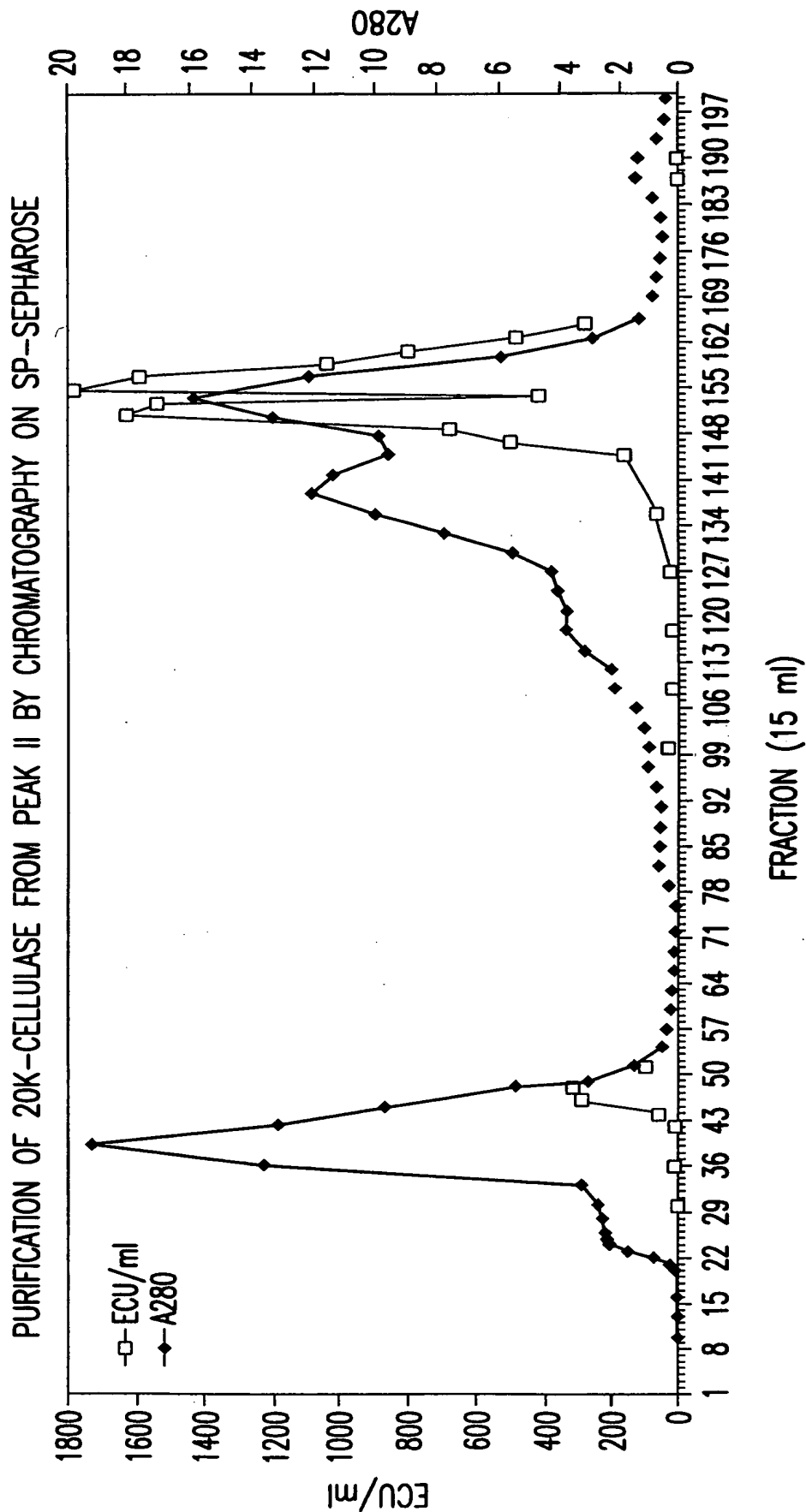


FIG.8

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 Thereof

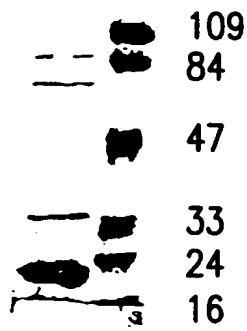


FIG.9A

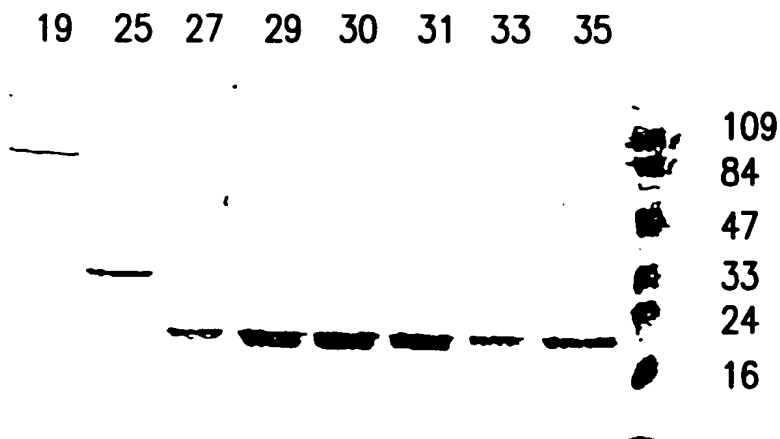


FIG.9B

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 Thereof

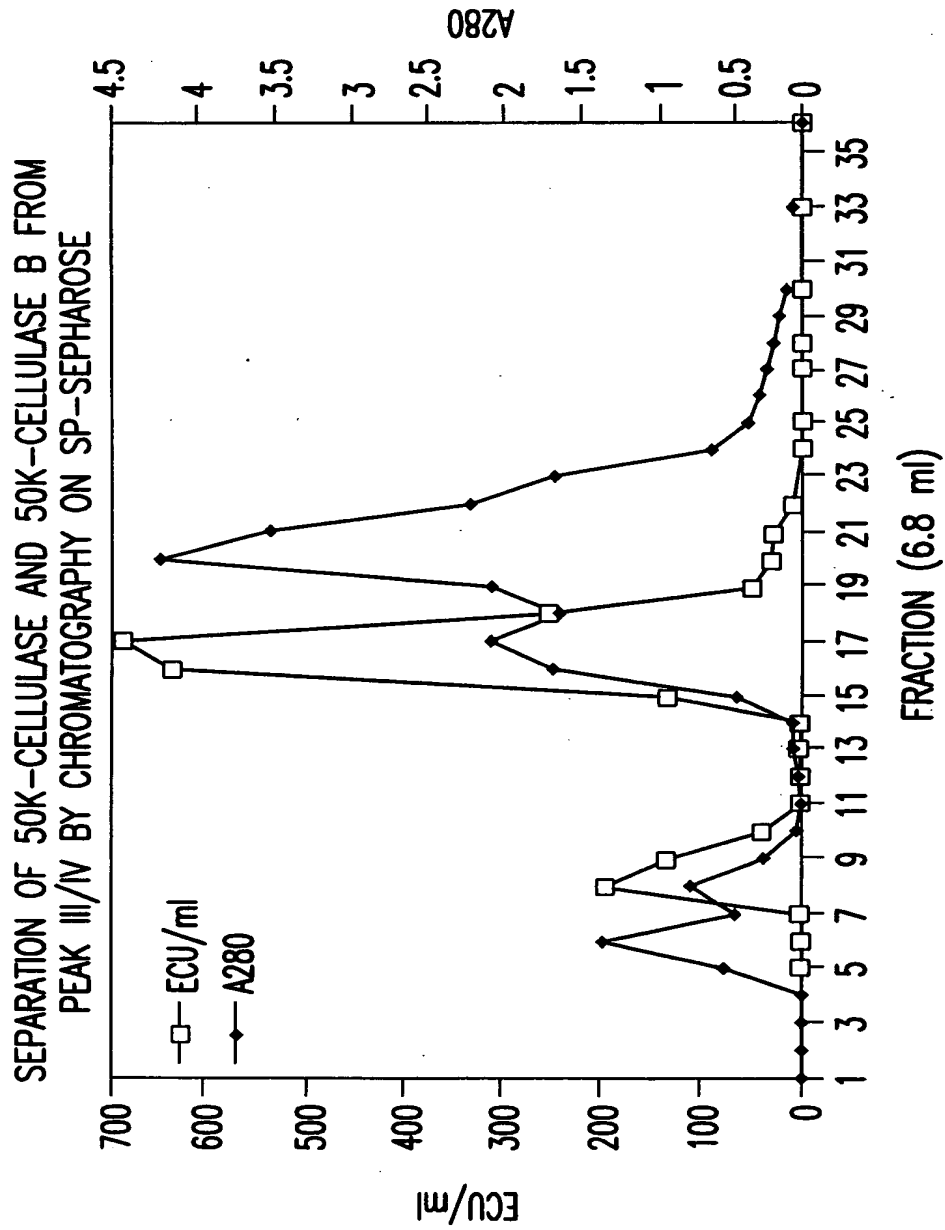


FIG.10

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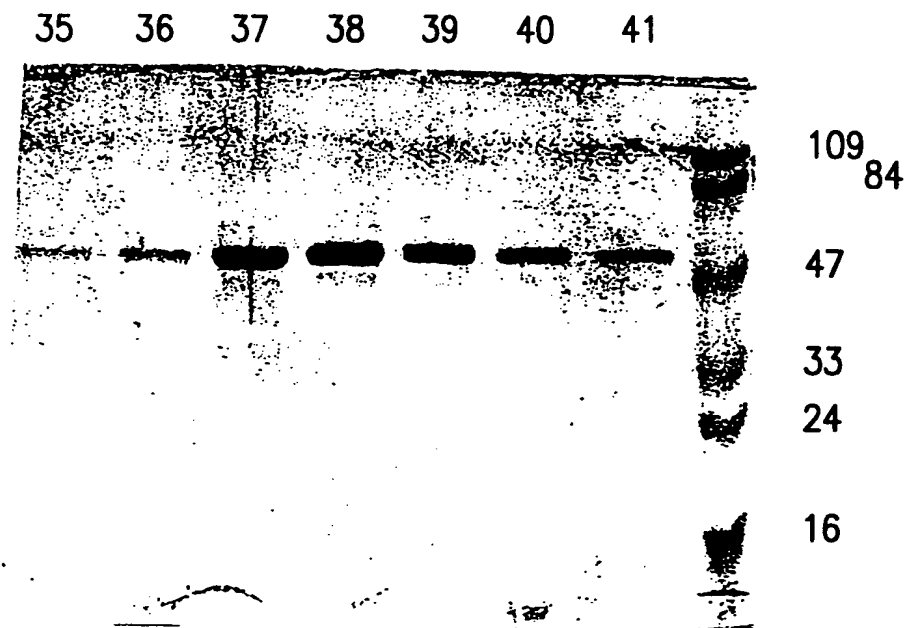


FIG. 11A

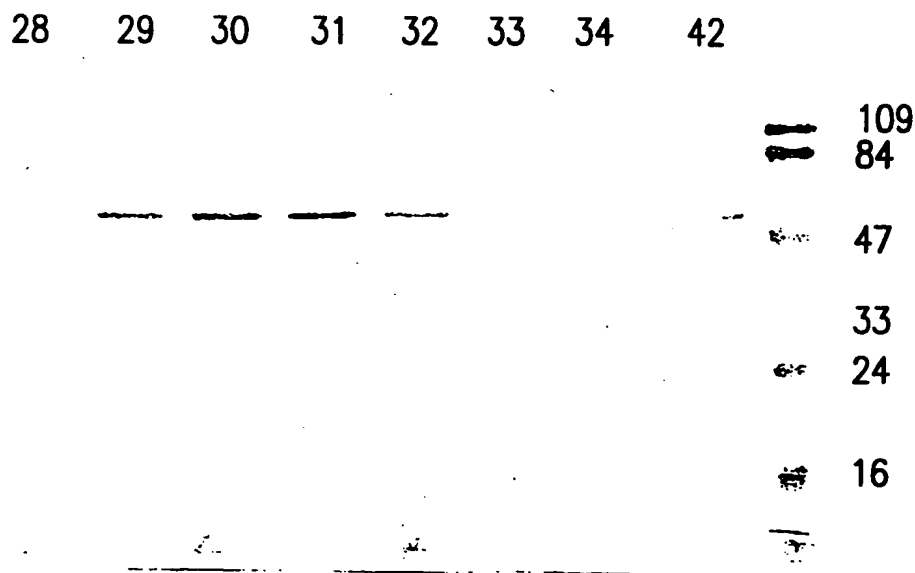


FIG. 11B

BEST AVAILABLE COPY

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TEMPERATURE DEPENDENCE OF THE  
ENDOGLUCANASE ACTIVITY OF 50K-CELLULASE  
AT pH 7.0

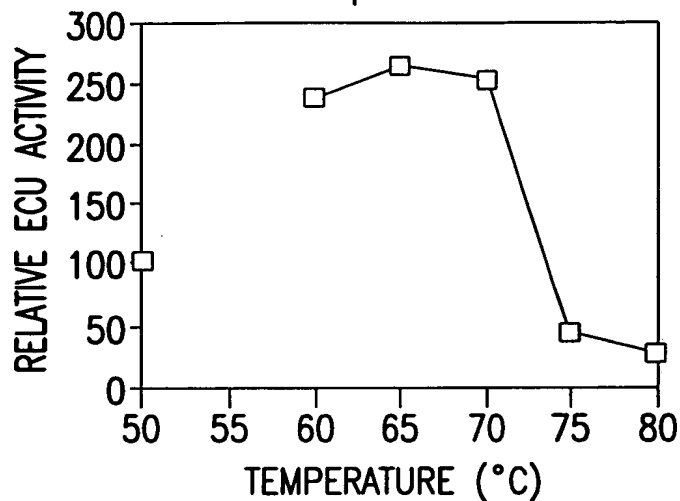


FIG.12

THE pH DEPENDENCE OF THE ENDOGLUCANASE  
ACTIVITY OF 50K-CELLULASE AT 50°C AND 70°C

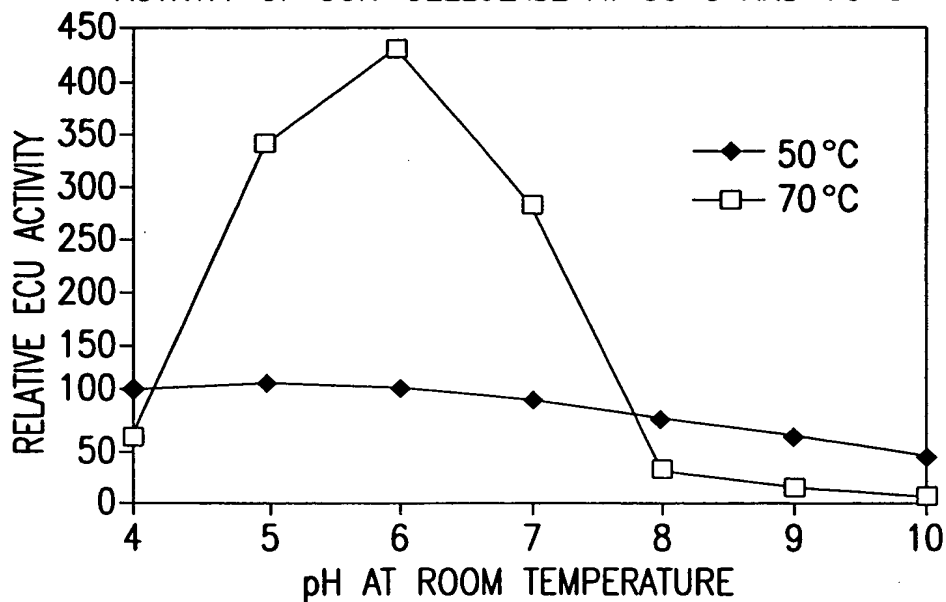


FIG.13

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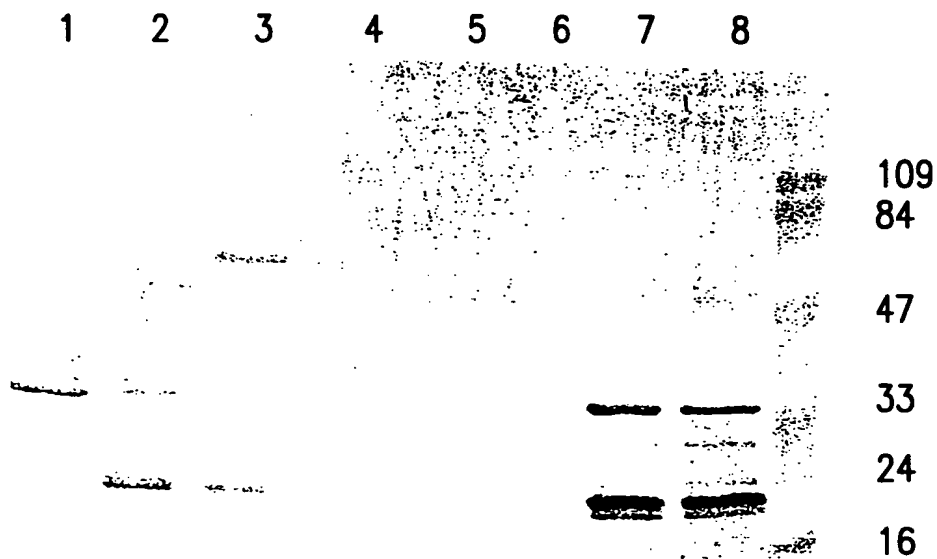


FIG.14

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Thereof

20K-CELLULASE: TEMPERATURE DEPENDENCE OF  
ENDOGLUCANASE ACTIVITY AT pH 7 (10 MIN REACTION  
TIMES)

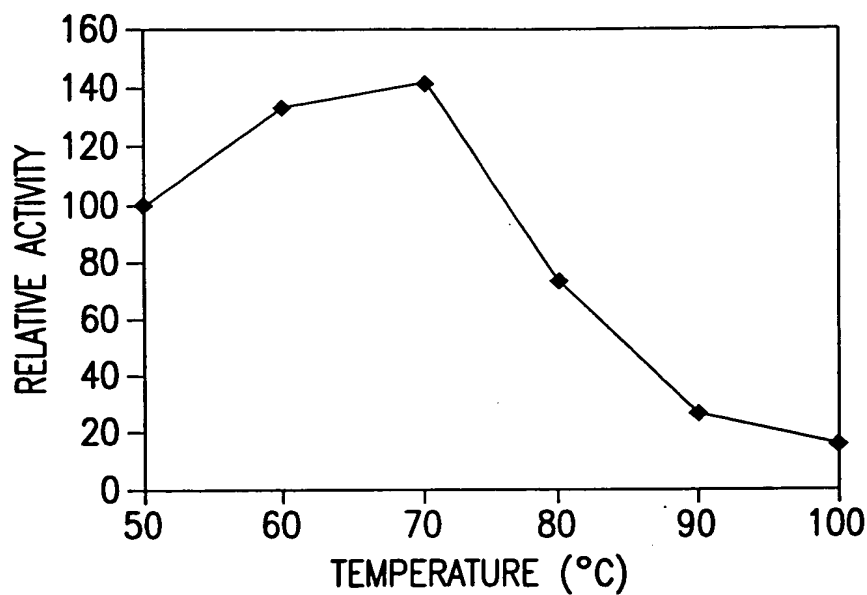


FIG.15



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20K-CELLULASE: pH-DEPENDENCE OF ENDOGLUCANASE  
ACTIVITY (10 MIN REACTION TIMES)

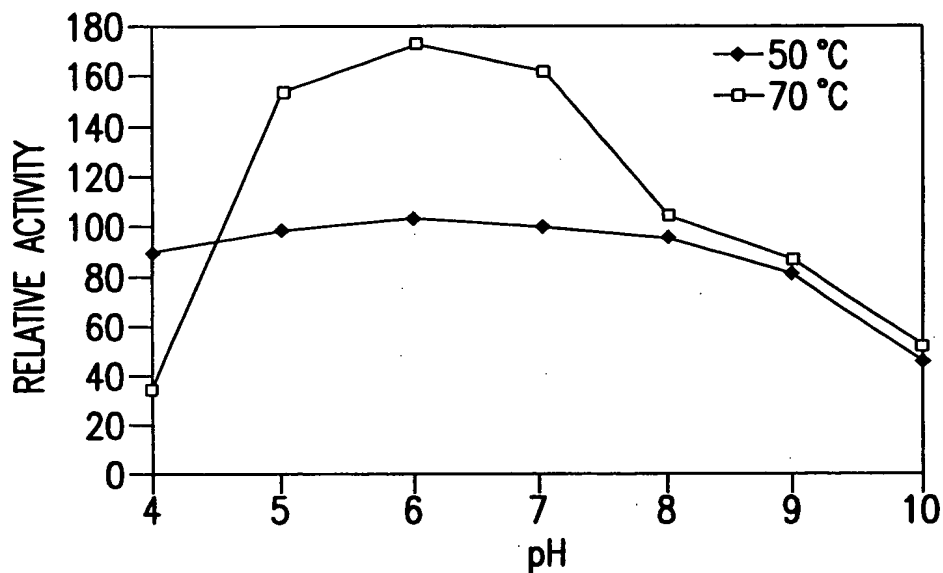


FIG.16A

20K-CELLULASE: pH-DEPENDENCE OF ENDOGLUCANASE  
ACTIVITY (60 MIN REACTION TIMES)

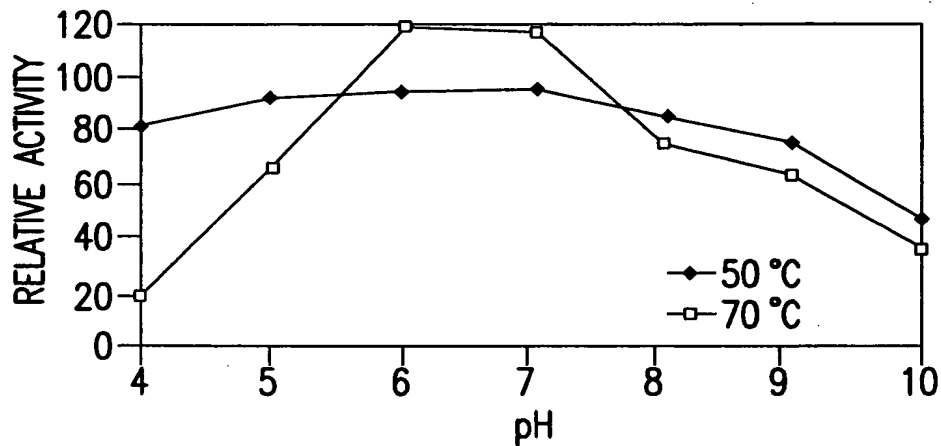


FIG.16B

# 429  
ANGQSTRYWDCCKPSCGWRGKGPVNQPVYS

# 430  
YGGISSR

# 431  
CGWR

# 432  
PSCGWR

# 433  
YWDCCCK

# 439  
QECDSFPEPLKPGCQWR

fr 9  
RHDDGGFA

fr 14  
YWDCCCKP

fr 16  
GKGPVNQPVYSCDANFQR

fr 17  
VQCPEELVAR

fr 28  
DWFQNADNPSFTFER

fr 30  
TMVQSTSTGGDLGSNHFDLNIPGGGVGLF

FIG.17

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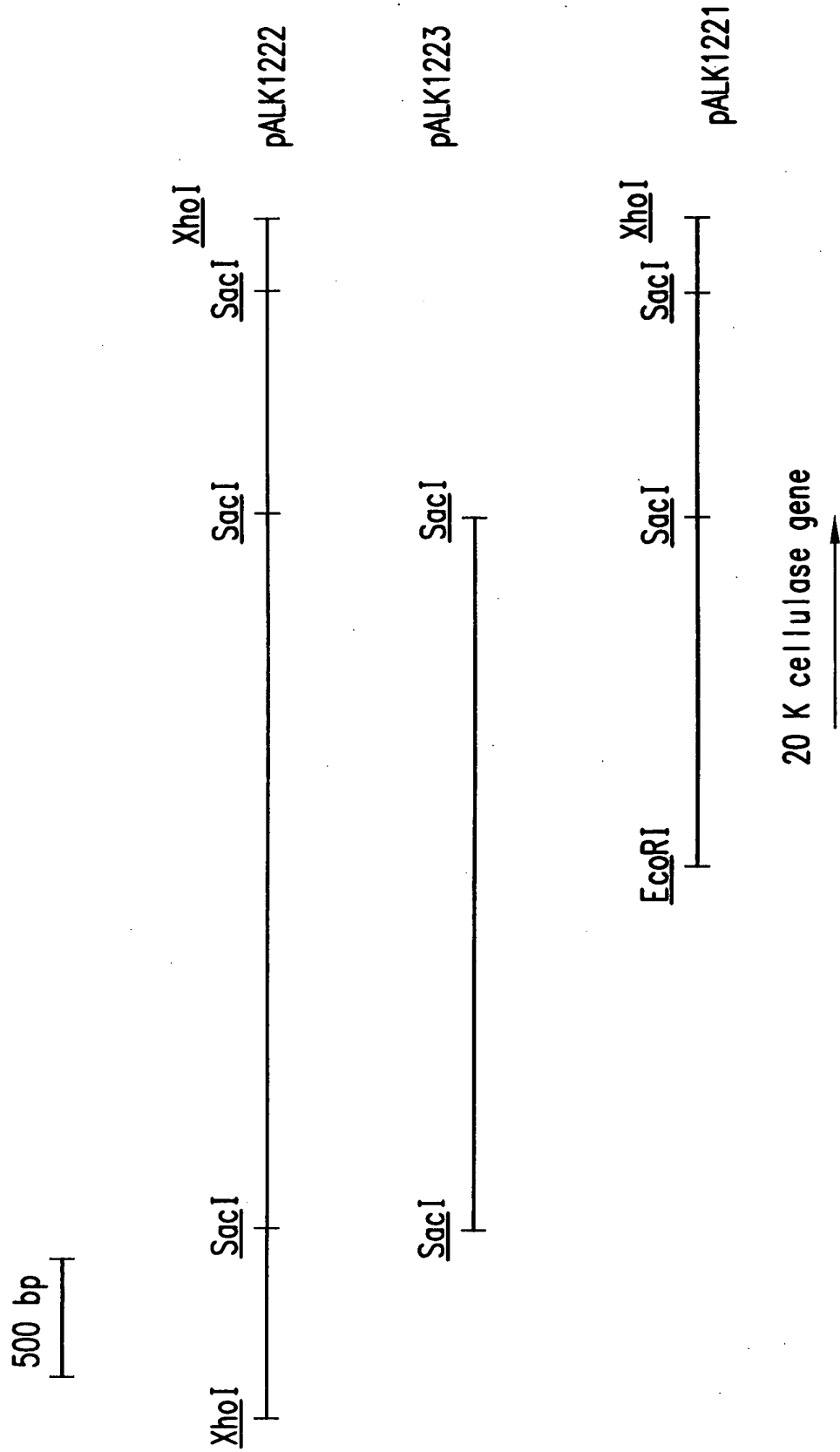


FIG.18

```

-30          -10          10          30          50
TCGCCCCTAACCGAGAACCAAGACTCCAAGATGGGCTCTACTCCCGTTCTCGGGCCCTCTCTGGCCGAGCATTGCCCCCTCGGGCCCTCGCCGCCAA
      M R S T P V L R A L L A A L P L G A L A A N
70          90          110          130          150
CGGTCAGTCCACGAGGtaactgatcaccgcctcattacgcgtgccgaccggaccggttcagggtcactgctcaccgcatccagATACTGGGACTGCT
G Q S T R          Y W D C C
170         190         210         230         250
GCAAGCCGTCGTGGGCTGGCGGGAAGGGCCCGGTGAACACAGCCCGTCTACTCGTGGCAGCGCAACTTCCAGCGCATCCACGACTTCGATGCCGTCTC
K P S C G W R G K G P V N Q P V Y S C D A N F Q R I H D F D A V S
270         290         310         330         350
GGGCTGCGAGGGGCGCCCGCCTTCTCGTGGCGCGACACAGCCCGCTGGGCCATTAAATGACAACCTCTCGTACGGCTTCGGCGGCGACTGCACCTCAGCGGC
G C E G G P A F S C A D H S P W A I N D N L S Y G F A A T A L S G
370         390         410         430         450
CAGACCGAGGAGTCGTGGTGTGCTGCTACGGGtgagtgtgtcttgggcccaacgtcggtgattccggagttcagaccactgaccacgagcccgctc
Q T E E S W C C A C Y A

```

FIG.19A

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```

470      gccagTCTGACCTTTACATCGGGTCCCGTGGCCGGCAAGACCATGGTGGTCCAGTCGACACGACGGGGCGGCGACCTCGGCAGCAACCACTTCGACCTCA
      L T F T S G P V A G K T M V V Q S T S T G G D L G S N H F D L N

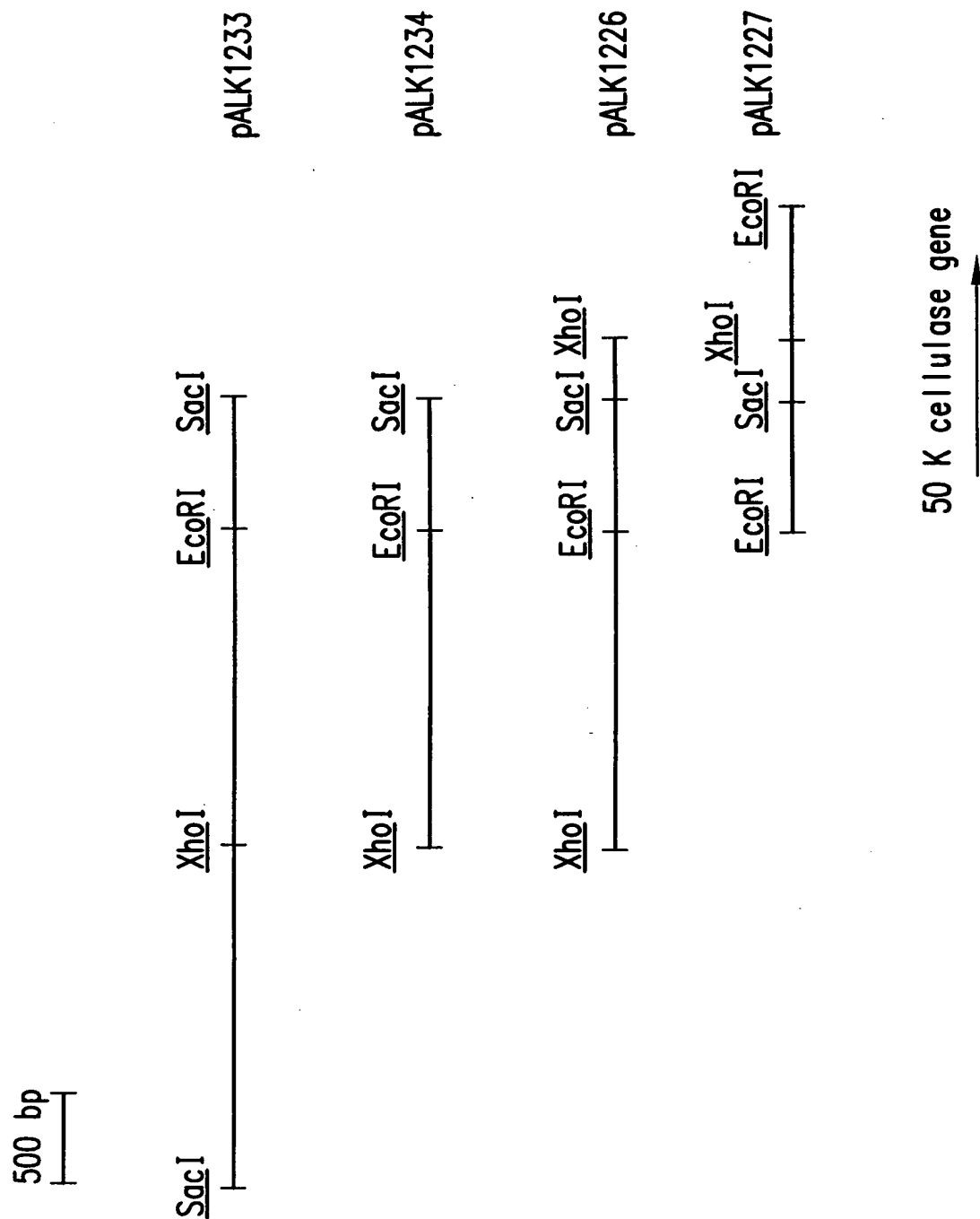
570      ACATCCCCGGCGGCGGTGGCCCTCTTCGACGGCTGCACTCCCCAGTTCGGCGGCCCTCCCGGGCGCACGGTACGGCGGCATCTCGTCGGCGCCAGGAGTG
      I P G G V G L F D G C T P Q F G G L P G A R Y G G I S S R Q E C

670      CGACTCGTTCGCCGAGCCGGCTCAAGCCCGGCTGCCAGTGGCGCTTCGACTGGTTCAGAACGCCGACACCCGTCCTTACCTTCGAGCGGGTCCAGTG C
      D S F P E P L K P G C Q W R F D W F Q N A D N P S F T F E R V Q C

770      CCCGAGGAGCTGGTCGCTCGGACCGGGCTGCAGGGGCCACGACGACGGCGGCTTCGCCGCTCTCAAGGCCCCCGACGGCCTGATCCGTTTTTGGGCAGTGTC
      P E E L V A R T G C R R H D D G G F A V F K A P S A *

870      CGTGTGACGGCAGCTACGTGGAACGACCTGGAGCTC
    
```

Fig. 19B



```

-230          -210          -190          -170          -150
      GAATTCGGGGGTTGCCAGGGAGTCGTACAGGGGTGGGTGGAGGGGGATGGGGGATGGAAGGGGGATGGAGAAGAAAGCATATATGGGACGTTTGTGCTC

-130          -110          -90          -70          -50
      GCGGGTCCCTCTGCCACGTTCCCTTGCCTCCCTTGGCTGGTGTGGTCTCCCTTCACCATCCGACAAACCAACCTGCTGCGGGTGAACTCGCA

-30          -10          10          30          50
      GAGCGCCTTCGGACGACGACAGACGACGCCATGACTCGCAACATCGCCCTGCTCGGGCGCGGTGGGGCTCCTGGGCCTCGCCACGGCCAGAAGC
      M T R N I A L L G A A S A L L G L A H G Q K P

70          90          110          130          150
      CGGCGAGACGCGCGAGGTGCACCCGAGCTGACGACGTTCCGGTGCACCAAGCGGACGGGTGCCAGCCGGGACCAACTACATTGTGCTGGACTCGCT
      G E T P E V H P Q L T T F R C T K A D G C Q P R T N Y I V L D S L

170          190          210          230          250
      GTCGCACCCGGTGCACACGAGTGGACAACGACTACAACCTGCGGCGACTGGGGGCAGAAAGCCCAACGCGACGGGTGCCCGGACGTCGAGTCGTGCGCGCGC
      S H P V H Q V D N D Y N C G D W G Q K P N A T A C P D V E S C A R

270          290          310          330          350
      AACTGCATCATGGAGGGCGTCCCGGACTACAGCCAGCACGGCGTCACGACGAGCGACACGTCGCTGCGGCTGCAGCAGCTCGTCGACGGCCGCTCGTCA
      N C I M E G V P D Y S Q H G V T T S D T S L R L Q Q L V D G R L V T

```

FIG.21A

```

370          390          410          430          450
CGCGCGGCTCTACCTGCTCGACGAGACCGGACCGCTACGAGATGATGCACCTGACCGCGGAGGAGTTACCTTTGAGGTCGACGCCACCAAGCTGCC
P R V Y L L D E T E H R Y E M M H L T G Q E F T F E V D A T K L P

470          490          510          530          550
CTGCGGCATGAACAGGCCCTCTACCTGTCCGAGATGGACCCGACCGGCGCCGGAGCGAGCTCAACCCCGGCGGTGCCTACTACGGCACCGGCTACTGC
C G M N S A L Y L S E M D P T G A R S E L N P G G A Y Y G T G Y C

570          590          610          630          650
GACGCCAGTGTTCGTGACGCCATTTCATCAACGGCATTgtgagtgttccctttggccccccccctgaaaaatagatgtacctgggtgctaacccccgggg
D A Q C F V T P F I N G I

670          690          710          730          750
tgtcgacccaaaacagGGCAACATCGAGGGCAAGGGCTCGTGTGCAACGAGATGGACATCTGGGAGGCCAACTCGCGGGCGACGCACGTGGCGCCGCAC
G N I E G K G S C C N E M D I W E A N S R A T H V A P H

770          790          810          830          850
ACGTGCAACCAAGACGGGTCTGTACATGTGCGAGGGCGCGAGTGCAGGTGCGACGGCGTGTGCGACAAGGACGGGTGCGGGTGGAAACCGTACCGGGTCA
T C N Q T G L Y M C E G A E C E Y D G V C D K D G C G W N P Y R V N

870          890          910          930          950
ACATCACCGGACTACTACGGCAACTCGGACCGGTTCCGGCTCGACACGGGGGGCCCTTCACCGTGGTGACGCAGTTCCTCGGGCCGACGCCGAGGGCCGGCT
I T D Y Y G N S D A F R V D T R R P F T V V T Q F P A D A E G R L

```

FIG. 21B



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970	990	1010	1030	1050
CGAGAGCATCCACCGGCTGTACGTGCAGGACGGCAAGGTGATCGAGTCGTACGTGCGACGCGCGGGCCCTGCCCGGACCGACTCGCTCAACGACGAG				
E S I H R L Y V Q D G K V I E S Y V V D A P G L P R T D S L N D E				
1070	1090	1110	1130	1150
TTCTGGCGCGCCACGGGGCGCGGCTACCTCGACCTCGGGCGGCACCGGGGCATGGGCGACGCCATGACGGCGGCGCATGGTGTGCCCATGAGCATCT				
F C A A T G A A R Y L D L G G T A G M G D A M T R G M V L A M S I W				
1170	1190	1210	1230	1250
GGTGGGACGAGTCCGGCTTCATGAACCTGGCTCGACAGCGGGGAGGGCGGCCCTGCCTGCCCGACGAGGGCGACCCCAAGAACATTGTCAAGGTCGAGCC				
W D E S G F M N W L D S G E A G P C L P D E G D P K N I V K V E P				
1270	1290	1310	1330	1350
CAGCCCCGAGGTCACCTACAGCAACCTGCGCTGGGGCGAGATCGGGTCGACCTTTGAGGCGGAGTCCGACGACGCGGCGGACGCGGACGACTGCTAGATA				
S P E V T Y S N L R W G E I G S T F E A E S D D G D G D C *				
1370	1390	1410	1430	1450
ACTAACTAGTGGCGGAAAGGGCGGGGATGCGTAACCTACATACAGCCCGGAGTTGTTTGAGTGTAGAGTATTGAGCTTTCGATGTTAGTTGAGTG				
1470	1490	1510	1530	1550
GAATGGAAAATTCGGCTCTTTGCCCGGTTGGTGGGATGCGATAAACAATAGTCGGCTGGTGCATTGTGACACTTCAATTGGCGTGTGGCTTGGTGACAGACA				
1570	1590	1610	1630	1650
CGGCAGGTCGATGACCCGACACCCAGAATAATTCGCATGGTTGATTANTGTTATTGTGCTTTAAATCGGAGGCTGATGCTCATCTCTCGAATTC				

FIG.21C

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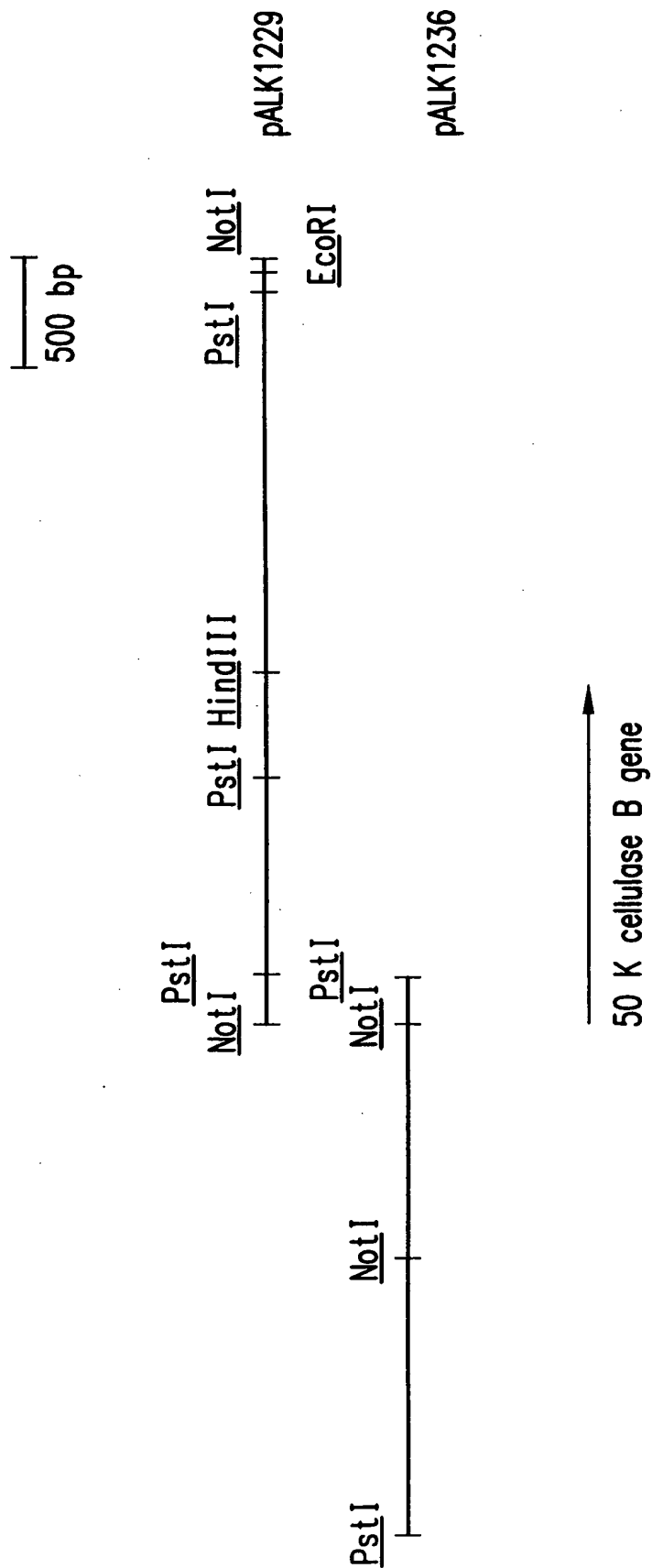


FIG.22

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-150      -130      -110      -90      -70
CCC GG TCT GGA GAC GGG GAG CGC CAG CGC AGG ATA AAG AGG CAG CAC CGC CCT CCG AGC CAG GCC CAG GAC AGC AGA AACT CGC CAC GCG GC

-50      -30      -10      10      30
AAG CAG CAC GCG CGC GAT CGA CAG TGT CCG CGT CTG CCC A CAG CACT CTG CAA CCA AT GAT GAT GAA G CAG TAC CTG CAG TAC CTG CGG CGC GCG TGC CGCT
                                     M M M K Q Y L Q Y L A A A L P L

50      70      90      110      130
CGT CGG CCT CGC CGC GCG CAG CGC GCT GGT AAC GAG ACG CGC CGG AGA ACC ACC CCG CT CAC CTG GCAG AGGT GGC AGG CCG CGC CCA ACT GCC AG ACC
V G L A A G Q R A G N E T P E N H P P L T W Q R C T A P G N C Q T

150      170      190      210      230
GTG AAC GCG GAG GTG TCATTGACGCCAACTGGCGCTGGCTGCACGACGACAACATGCAGAACTGCTACGACGGCAACCACTGGACCAACGCCTGCAGCA
V N A E V V I D A N W R W L H D D N M Q N C Y D G N Q W T N A C S T

250      270      290      310      330
CGGCCACCGACTGCGCTGAGAAGTGCATGATCGAGGGTGCCGGCGGACTACCTGGGCACCTACGGCGCCTCGAC CAG GCG CAG CGC CCGCTGACGCTCAAGTT
A T D C A E K C M I E G A G D Y L G T Y G A S T S G D A L T L K F

350      370      390      410      430
CGTCACCAAGCAGCAGTACGGCACCAACGTCGGCTCGCGCTTCTACCTCATGAACGGCCCGGACAAAGTACCAGATGTTCAACCTCATGGGCAACGAGCTT
V T K H E Y G T N V G S R F Y L M N G P D K Y Q M F N L M G N E L

```

FIG. 23A

**FIG. 23B**

1150	1170	1190	1210	1230
gctgcagCGTCTGCTCCCGCTTCGAGGAGAACAAAGCTCTCCAGTACTTCATCCAGGACGGCGCAAGATCGAGATCCCGCGCCGACGTTGGGAGGGCAT				
	V V S R F E E N K L S Q Y F I Q D G R K I E I P P T W E G M			
1250	1270	1290	1310	1330
GCCAACAGCAGCGAGATCACCCCGAGCTCTGTCTCCACCATGTTTCGATGTGTTCAACGACCGCAACCGCTTCGAGGAGGTCGGCGGCTTCGAGCAGCTG				
	P N S S E I T P E L C S T M F D V F N D R N R F E E V G G F E Q L			
1350	1370	1390	1410	1430
AACAAAGCCCTCCGGGTCCCATGGTCCCTCGTCATGTCCATCTCGGACGACgtaagtaccgcgcgacctcctagccacacaagccgcgcgagggc				
	N N A L R V P M V L V M S I W D D			
1450	1470	1490	1510	1530
agccatcgctgctaacacgagaccgttcgtagCACTAGCCCAACATGCTCTGGCTCGACTCCATCTACCCGCCGAGAGGAGGCCAGCCCGGCG				
	H Y A N M L W L D S I Y P P E K E G Q P G A			
1550	1570	1590	1610	1630
CCGCCCGTGGCGACTGCCCCACGGACTCGGGTGTCCCCCGCGAGGTTCGAGGCTCAGTTCCCCGACGCGgtaagacttgcccccgacccccaaagtctccactt				
	A R G D C P T D S G V P A E V E A Q F P D A			
1650	1670	1690	1710	1730
ctggatgccgaatgctaacacgcgaaacagCCAGGTGCTCTGGTCCAACATCCGCTTCGGCCCATCGGCTCGACCTACGACTTCTAAGCCGGTCCATGC				
	Q V V W S N I R F G P I G S T Y D F *			
1750	1770	1790	1810	1830
ACTCGAGCCCTGGGGCCCGTCACGCCCGCCACCTCCCCTCGCGGAAACTCTCCGTGGTTCGGGGCTCCAAAGCATTTTGGCCCAAGTTTTTCGTTTC				

FIG.23C

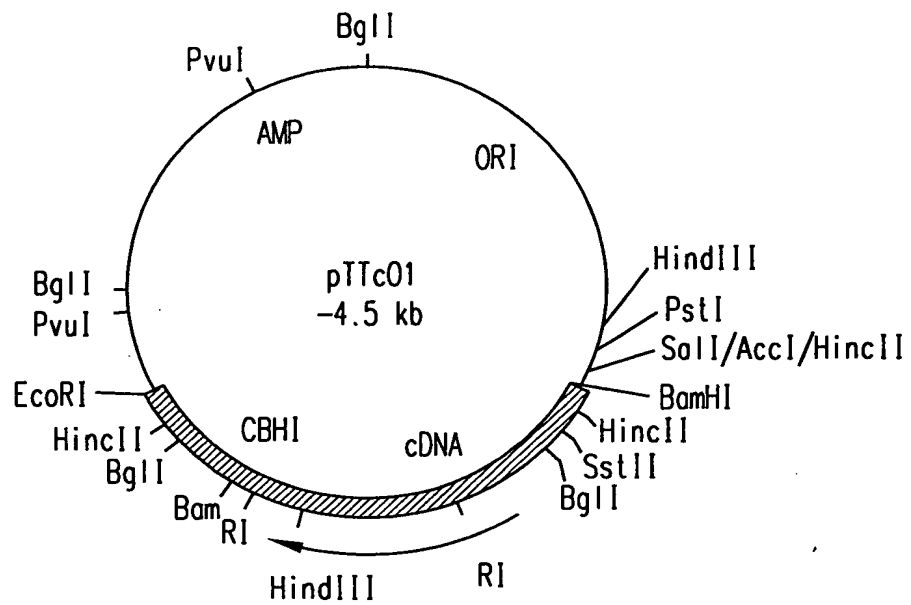


FIG.24

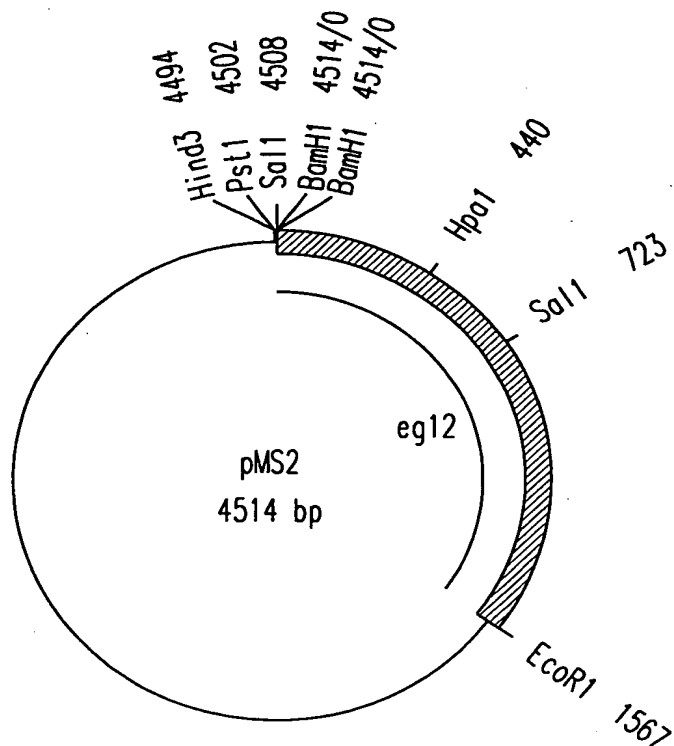


FIG.25

Appl. No. *To Be Assigned*; Filed: *Herewith*  
Dkt. No. 1716.051000A; Group Art Unit: *To Be Assigned*  
Inventors: Miettinen-Oinonen *et al.*; Tel.: (202) 371-2600  
Title: Novel Cellulases, the Genes Encoding Them and Uses  
Thereof

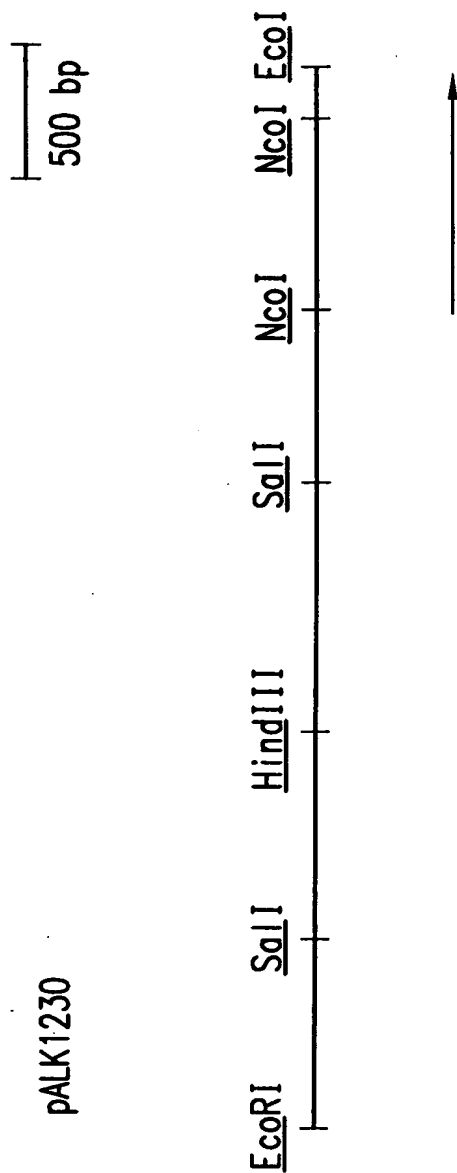


FIG.26

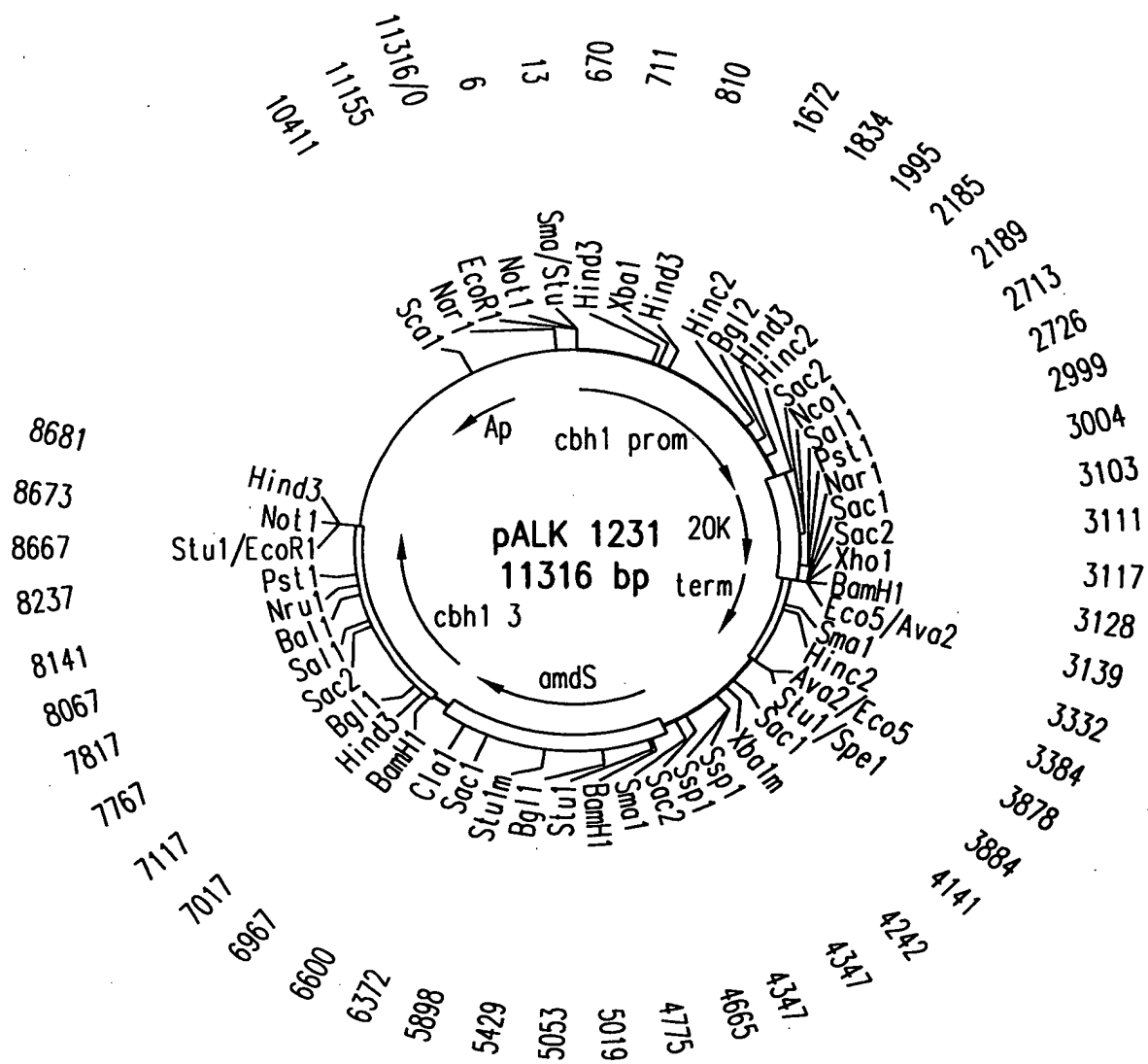
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10          30          50          70          90
CCATGGACGCGAACTGCGACGCTCTTCTGCCCCGAGCTGAAGACCCAGAGCATCCAGACCGGCAACCACTGACCCAGGAGATGAAGGTCTACGAGAACAT
110          130          150          170          190
TGACGGCTGGCTCGACAGCCTGCCCGGCAACGTCCCCCATCACCGTCCGACGCCGGCTCTGGTAAGTCAAGAGATGATGCCTACCTACCTTCCACCT
210          230          250          270          290
TCCACCCAGCGCAATAACCTTTCTCCCTCCCGTGCCCGTATCTTCAACGCCCGAGACTGACAGACCCGCTCGTCCAGGGGCAACCCCGGCA
310          330          350          370          390
ACGGCGGGGAGCAACCCGGGCAACGGGGGCGGGGGCTGCACCGTCCAGAAAGTGGGGCCAGTGGGGCGGCATCGGCTACTCGGGGCTGCACCACTG
410          430          450          470          490
CAAGGCGGGCTCGACCTGCCCGGCCAGAACGAGTACTACTCGCAGTGCCTGTAAAGCGGCGCGTGGGCTAGGTGGCCGAGCGGGGGGTTCTTCATTGG
K A G S T C P A Q N E Y Y S Q C L *
510          530          550          570          590
TTGAGCAAATAGAACAGGAATTCGGGCTGTTGGCAGCGGCGCGGGGGATGGTGTGTACAATTCAAGACCTCAGTACCGAGGGACCTGGAAAGGA
610          630          650          670          690
GTCAGTCTGCTTGACGGAGGCTGGCTGCCCGCTGGCGGCGCTGGCAAGGTAGTAGCCCTTCATTGCTGTAACTAGTATGCTATATACCTCTGCACAT
710          730          750          770          790
TGCAGCCCCATGGTGTGAACAACAAGTGACAAGGCTTCCAGTTCAGGCTCGCGCAATTGTCAGGATATCCTTGGTCCATCTATATGTAATGGGCATGAGC
810          830          850          870
GAGTCGAGAAAATGTACCGCGAAAAATCGTAGTACCTGGCACTGGCGGCTTCTACCACCGTAGGATTGAAGTGAATCTCGAATTC

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FIG. 27





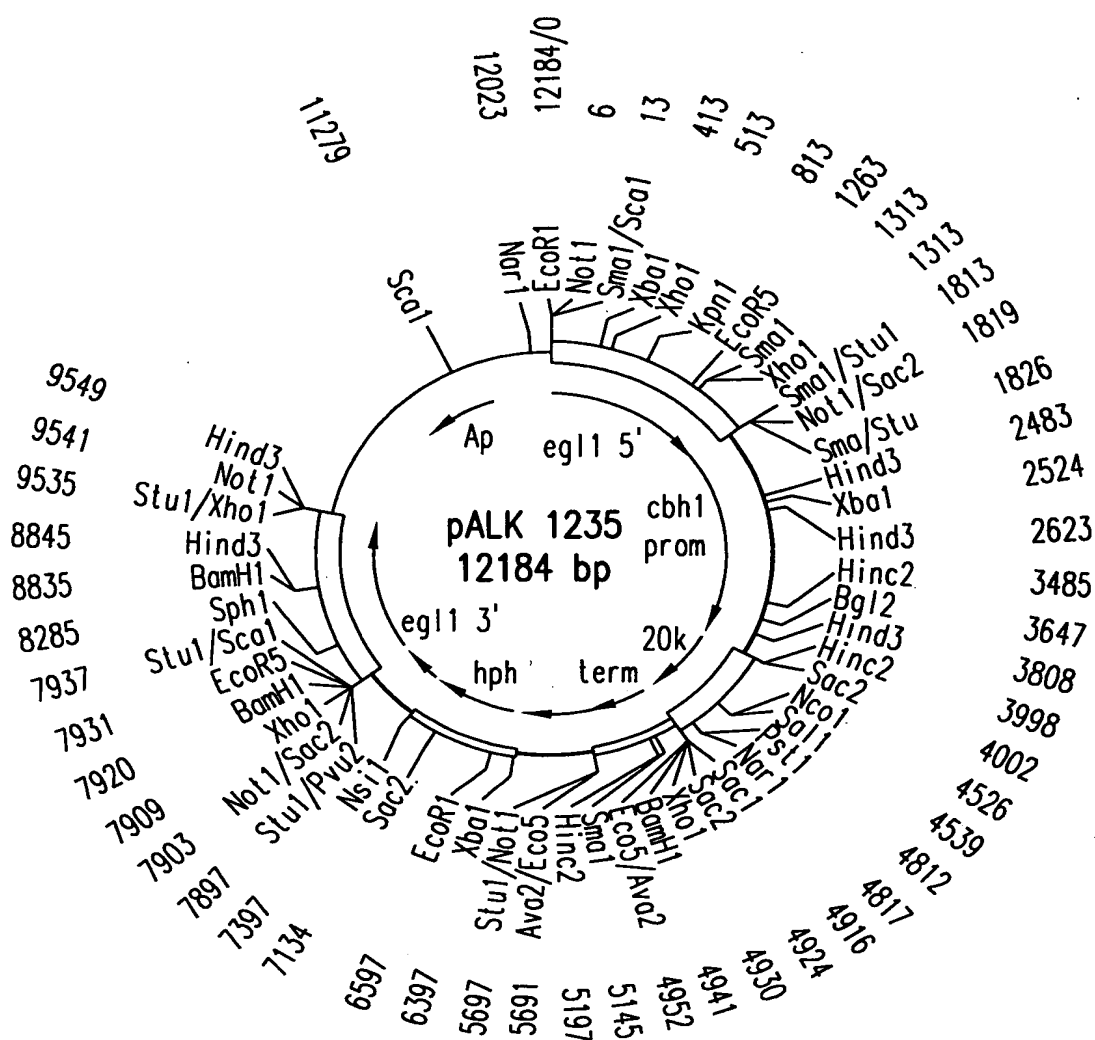


FIG.29

Appl. No. *To Be Assigned*; Filed: *Herewith*  
Dkt. No. 1716.051000A; Group Art Unit: *To Be Assigned*  
Inventors: Miettinen-Oinonen *et al.*; Tel.: (202) 371-2600  
Title: Novel Cellulases, the Genes Encoding Them and Uses  
Thereof

1 2 3 4 5 6

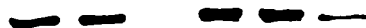


FIG.30

Appl. No. *To Be Assigned*; Filed: *Herewith*  
 Dkt. No. 1716.051000A; Group Art Unit: *To Be Assigned*  
 Inventors: Miettinen-Oinonen *et al.*; Tel.: (202) 371-2600  
 Title: Novel Cellulases, the Genes Encoding Them and Uses  
 Thereof

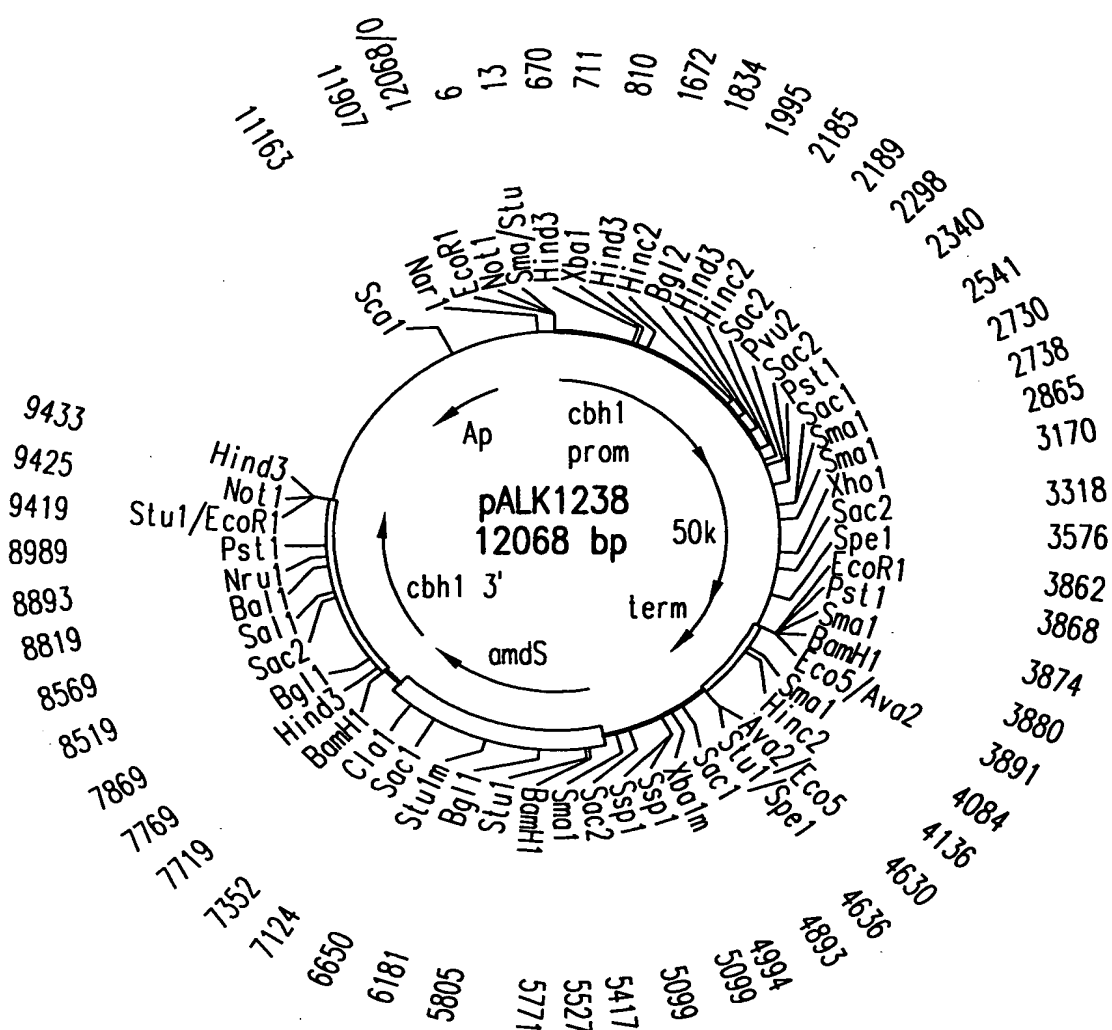


FIG.31

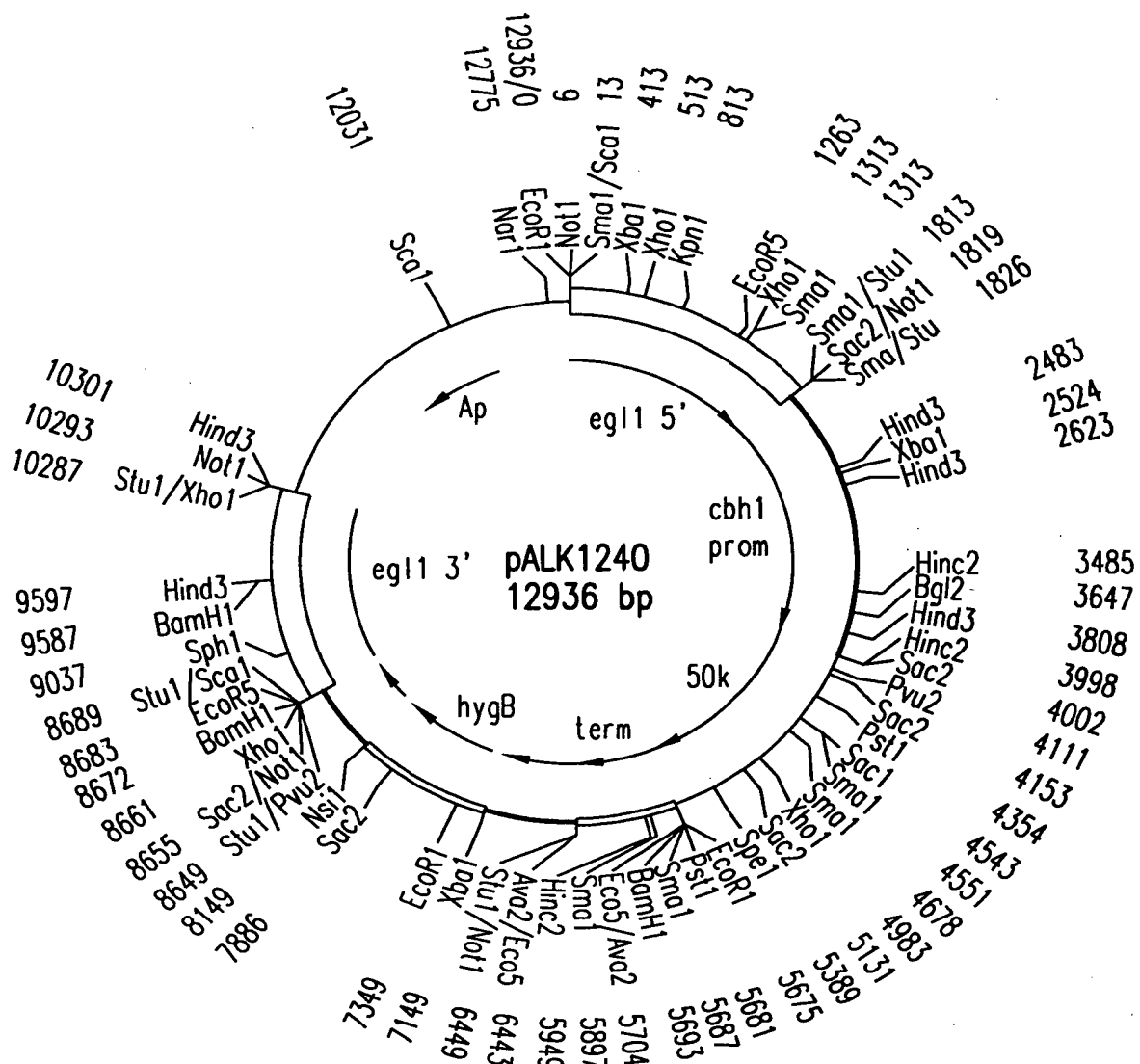


FIG.32